

Chapter 9

Estimates of Attention, Cognitive, and Emotional Problems, and Health Service Use by U.S. School-Age Children

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Introduction

The 1999 U.S. Surgeon General's Report on Mental Health called the Nation's attention to mental health as a critical domain of public health. The public health approach to mental health "goes beyond diagnoses, treatment, and etiology to encompass epidemiologic surveillance, such as the monitoring of prevalence rates and issues related to service utilization in the population" (U.S. Department of Health and Human Services [DHHS], 1999). National estimates of measures of mental health problems and of mental health service use are needed to determine patterns of use and unmet mental health needs. Furthermore, examination of differences in rates of disorders among population subgroups may lead to clues about the etiology of mental disorders. Often, the data used in mental health research are gathered from clinics and fail to represent children who do not receive services (Dulcan, 1996). In response to the need for population data on the mental health of children, the staff of the National Health Interview Survey (NHIS), an annual survey created in 1957 to monitor the health of the civilian noninstitutionalized U.S. population, worked with staff at the U.S. Center for Mental Health Services (CMHS) to include questions on children's mental health and use of health services when the survey was redesigned in 1997.

According to the Surgeon General's Report, common mental conditions among children include

attention deficit disorder (ADD), behavior disorders, depressive disorders, and learning and developmental problems (DHHS, 1999). Prevalence rates cited in the literature for mental, emotional, and attention problems among U.S. children vary. Costello (1989) reported that 22 percent of children from a sample of 789 children had mental health conditions. She stated that one problem in identifying mental health conditions is the lack of agreement among researchers on the decision rules used to make a diagnosis. Achenbach and Howell (1993), using data for 2,466 children, found that 18.2 percent were in the clinical range for mental health conditions.

The enactment of the Alcohol, Drug Abuse, and Mental Health Administration Act of 1992 required CMHS to establish a definition for children with serious emotional disturbance (SED). To meet this definition, published in 1993, children must have a psychiatric diagnosis and a related functional impairment. Using data from the 1994–95 NHIS Survey on Disability, Colpe (2001) examined children with mental and emotional problems who had impairments, such as difficulty paying attention in class, controlling behavior, communicating, getting along with others, and attending class. These criteria identified 8.3 percent of U.S. children as having mental health impairments.

One of the difficulties in monitoring mental health conditions is finding appropriate and valid measures that can be used in population surveys.

Most diagnostic instruments used to measure children’s mental health conditions are long and not suited for ongoing population surveys that interview parents. Although the questions included in NHIS on children’s mental health do not provide clinical diagnoses, they do provide data on parents’ perceptions of their children’s emotional and behavior health. Research has shown that parents’ responses are often sensitive indicators of children’s emotional or behavioral problems (Glascoe, et al., 1989; Glascoe, et al., 1991). Furthermore, parents are usually the decisionmakers when it comes to seeking mental health services for their children.

This chapter presents national prevalence estimates of ADD, developmental delay (DD), learning disabilities (LDs), and unhappiness or depression among school-age children. In addition, data are presented from an overall mental health indicator (MHI). These variables are examined by sociodemographic characteristics using parents’ responses to questions from the 1998–99 NHIS. National estimates are also provided on children’s use of health services, parents’ perception of unmet medical care needs, and comorbidity. Use of services among those with attention, cognitive, and emotional problems is also examined.

Data and Methods

The data in this report are from the 1998–99 NHIS. NHIS is an annual household survey that collects data from a nationally representative sample of the U.S. civilian noninstitutionalized population. In NHIS, respondents provide information about a wide range of health topics, and parents, or a knowledgeable adult, answer questions about children who are under the age of 18. NHIS is conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention.

In NHIS, some questions are asked about every member of the family; in addition, more detailed information is obtained from one randomly sampled adult and, if children are in the family, on one randomly sampled child. The data from the randomly sampled children are referred to as the sample child data. Interviews, which are conducted by Bureau of Census-trained field representatives, last an average of 1 hour. To produce more reliable estimates on the attention, cognitive, and emotional problems of children, the 1998–99 NHIS sample child data were combined to create a sample of 26,555 children. The response rates for the 1998 and 1999 sample child sections were 82.4 and 78.2 percent, respectively.

Because ADD, LD, and other emotional problems facing children appear to emerge or be identified when the children enter school, usually at about age five (Bloom and Tonthat, 2002), this chapter examines data for children ages 5 to 17.

The estimates presented in this chapter were weighted to represent children in the noninstitutionalized civilian U.S. population. Analyses were performed using SUDAAN, a statistical software package, to compute standard errors of estimates while accounting for the complex survey design. Missing data were excluded from this analysis. Item nonresponse for most of the sociodemographic indicators and the questions used in this analysis on mental health and health services was less than 1 percent. Item nonresponse for the income questions was 19.5 percent. Analyses to test for differences between percentages were performed using *t*-tests. Any differences explicitly noted in this chapter were found to be significant at the 0.05 level. Further information on the survey methods, questionnaires, and sampling procedures of the NHIS are available in Bloom and Tonthat (2002) and on the National Center for Health Statistics (NCHS) Web site at <http://www.cdc.gov/nchs/nhis.htm>.

Questions on Children’s Attention, Cognitive, and Emotional Problems

The following NHIS questions were used to define ADD and DD for this analysis:

Has a doctor or health professional ever told you that (child) had:

1. Attention Deficit Disorder (ADD)? Yes No
2. Mental retardation? Yes No
3. Any other developmental delay? Yes No

A child was defined as having ADD if the parent answered “yes” to question 1 and DD if the parent answered yes to question 2 or 3. The question on ADD was intended to capture children with attention and hyperactivity problems. If parents stated that their child had attention deficit hyperactivity disorder (ADHD), interviewers were instructed that parents should answer positively to question 1 (this question was revised in the 2000 NHIS to include ADHD). In this chapter, the term ADD is used for children with attention problems, hyperactivity, or ADHD.

A child was defined as having LD if the parent gave a positive answer to the following question:

Has a representative from a school or a health professional ever told you that (child) had a learning disability?

NHIS includes a subset of items from the Child Behavior Checklist (CBCL) (see appendix), a standardized instrument for obtaining parents' reports of their children's problems, which was developed by Achenbach (Achenbach and Ruffle, 2000). The items, which were used to construct an MHI, were chosen by the NCHS redesign staff for their ability to discriminate between children who were or were not referred for health services in the preceding 12 months. Demographically matched normative and clinical samples for four age and sex groups (boys and girls from ages 5 to 11 and 12 to 17) were used to select the items. The sex and age groups were used to take into account differences between the discriminative powers of particular items. Within each group, the three problems found to discriminate best between referred and nonreferred children were used to construct the MHI. The CBCL item on unhappiness/depression was significant for each group. Thus, the MHI is derived from a set of four questions for each age-sex group. Each question was scored as 0 (not true), 1 (sometimes true), or 2 (very true), and the scores for a given age-sex group were added to provide an overall total score that ranged from 0 to 8. For our purposes, children with overall scores of 2 or more were regarded as having a mental health problem according to the MHI. This cut point provided specificity of 81 percent for both boys and girls ages 5 to 11, with a sensitivity of 63 percent for boys and 58 percent for girls. For children ages 12 to 17, the specificity was 79 percent for boys and 76 percent for girls, with a sensitivity of 68 percent for boys and 58 percent for girls. A detailed description of the Relative Operation Characteristics (ROC) evaluation of the MHI is found in the Mental Health Index Appendix to the 1998 NHIS documentation on the NCHS Web site (<http://www.cdc.gov/nchs/nhis.htm>).

Because the MHI is an overall mental health indicator, it should identify some children with some of the specific problems studied here, such as ADD or LD. Thus, some overlap will exist between children identified by the MHI and those identified with other specific problems.

The following question on unhappiness/depression from the set of MHI questions described above was also examined separately:

Tell me if this has been NOT TRUE, SOMETIMES TRUE, or OFTEN TRUE of (child's name) during the past 6 months:

Has been unhappy, sad, or depressed?
Not true Sometimes true Often true

This question was also shown to discriminate between children who were and were not referred for mental health services in the preceding 12 months. A child was considered to be unhappy/depressed if the parent answered "Often true" to this question.

Questions on the Use of Health Services

Parents were asked if their child received special education services. Additional NHIS questions about health services inquired about seeing or talking to a mental health professional, such as a psychiatrist, psychologist, psychiatric nurse, or social worker; seeing a general doctor; seeing a medical specialist; and the inability to afford mental health care or counseling. Also, the following question on the use of prescription medicine was used:

Does (child's name) now have a problem for which he/she has regularly taken prescription medicine for at least three months?

However, there is no followup to this question to obtain the reason the child is taking prescription medicine. Whereas a child may be taking prescription medicine for an emotional or behavioral problem, he or she may also be taking it for another condition, such as asthma.

A variable called "perceived unmet medical needs" was created from the following questions:

During the past 12 months has (anyone in the family) delayed seeking medical care because of concern about the cost?

During the past 12 months, was there anytime when (someone in the family) needed medical care, but did not get it because of the cost?

During the past 12 months, was there anytime when (child) needed any of the following but did not get it because you couldn't afford it? Prescription medicine? Mental health care or counseling? Dental care (including check-ups)? Eye glasses?

Thus, a child was defined as having perceived unmet medical needs if the parents were unable to afford medical care, prescription medicine, eye glasses, dental care, mental health care, or counseling for the child at any time during the past 12 months, or if they delayed care for the child during the past 12 months because of cost. Most of these types of unmet medical needs did not pertain to mental health care explicitly, so the inability to afford mental health care or counseling was also examined separately.

Demographic and Other Variables

Demographic characteristics examined in this study included sex, age, race/ethnicity, mother’s education, and family structure. Children were categorized into three age groups: 5 to 9, 10 to 12, and 13 to 17 years old. Children’s race/ethnicity was categorized into four groups based on the parent’s classification of each child’s racial and ethnic background: “White non-Hispanic” children; “Black non-Hispanic” children; “Hispanic” children (includes children of Mexican, Puerto Rican, Cuban, Central and South American and unknown Latin American, and Spanish origin); and “Other” races/ethnicities.

Mother’s education reflects the number of years of schooling the mother had completed as of the interview date. In this report, the following categories were used: “No high school” means the mother did not complete high school; “High school or GED” means the mother obtained a high school diploma or a general equivalency diploma (GED); “Some college” means the mother attended, but did not graduate from, a four-year college; “College or higher” means the mother obtained a college or an advanced degree.

Family was dichotomized as “Single parent” or “Both parents.” A parent was either a biological, adoptive, step, in-law, or foster mother or father. Single-parent families had either a mother or a father living with the family; families with both parents had both a mother and a father living with the family.

The Bureau of Census definition for poverty status, based on family income and family size, was used in these analyses. For example, in 1998 the threshold for the poverty level for a family of four was \$16,660. Poverty status was categorized as “less than 100 percent of the poverty level”; “100-199 percent of the poverty level”; and “200 percent or more of the poverty level.”

Health Insurance

Type of health insurance coverage was categorized as follows: “Private” refers to children covered either by a private health insurance plan, which includes managed care health maintenance organizations (HMOs), or by a hospital plan; “Medicaid” refers to children who have either Medicaid or other public assistance; “Uninsured” refers to children who do not have coverage under any private health insurance plan, Medicaid, Medicare, public assistance, a State-sponsored health plan, other government-sponsored programs, or a military health plan. “Other” refers to children in military and other health insurance plans.

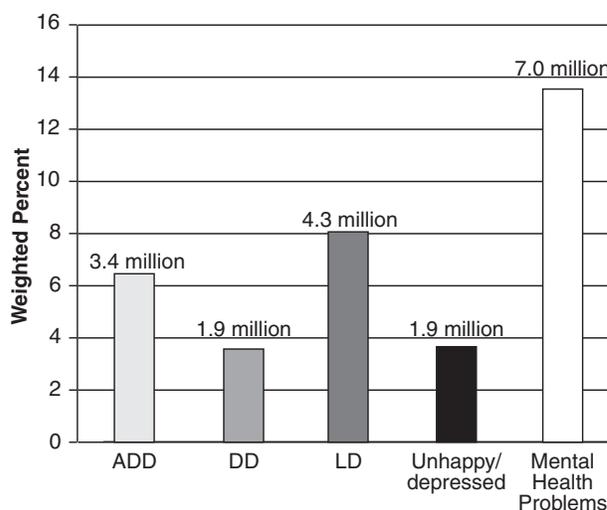


Figure 1. Percentage and Number of Children 5–17 Years of Age Who Have Emotional and Behavioral Problems.

Results

According to data from the 1998–99 NHIS, 6.6 percent of U.S. children ages 5 to 17 (3.4 million children) had ADD; 3.6 percent (1.9 million children) had DD; and 8.2 percent (4.3 million children) had LD (figure 1). Data based on parent reports for children ages 5 to 17 indicated that 3.7 percent (1.9 million children) were unhappy/depressed, and 13.6 percent (7 million children) had a mental health problem as indicated by the MHI. Table 1 shows the percentages of children who have attention, cognitive, or emotional problems by demographic characteristics, and table 2 presents data on the comorbidity of children with emotional or behavioral problems. Table 3 shows the percentages for all chil-

dren who have used selected health services. Table 4 reports health service use, comparing children with and without attention, cognitive, or emotional problems.

Attention Deficit Disorder

Several sociodemographic variables were significantly related to children having ADD, including sex, age, race/ethnicity, and family structure. As shown in table 1, the percentage of boys with ADD was almost three times as high as that of girls, 9.6 percent versus 3.3 percent. The percentage of children with ADD increased with age, from 4.8 percent for children ages 5 to 9 to 7.9 percent for children ages 10 to 12, but it appeared to level off at 7.6 percent for older adolescents. Regarding racial and ethnic differences, the prevalence of ADD was higher for White non-Hispanic children (7.8 percent) than for Black non-Hispanic children (5.0 percent), Hispanic children (3.5 percent), or children of other races/ethnicities (3.5 percent). More children who had ADD were living with a single parent (7.9 percent) than were living with both parents (5.8 percent).

Differences among children with ADD were also observed when analyzing poverty index level and health insurance status. More than eight percent of children who lived in families with a poverty index level less than 100 percent had ADD, whereas 6.6 percent of children who lived in families with a poverty index level of 200 percent or more had ADD. In terms of health insurance, 10.9 percent of children with Medicaid coverage, 5.8 percent of children covered by private insurance, and 5.7 percent of children who were uninsured had ADD.

Developmental Delay

Sociodemographic differences among children with DD were not as pronounced as those among children with ADD. Among the estimated 1.9 million children who had DD, the percentage of boys was higher than that of girls (4.5 percent versus 2.6 percent). Although age was not significantly associated with having DD, race/ethnicity was. White non-Hispanic children (3.9 percent) and Black non-Hispanic children (3.7 percent) had significantly higher percentages of DD than Hispanic children (2.5 percent) and children of other races/ethnicities (3.0 percent). Also, children living with a single par-

ent had a higher percentage of DD than children living with both parents (4.4 percent versus 3.2 percent). In addition, children covered by Medicaid had a higher percentage of DD compared with children with private insurance or no health insurance (8.0 percent versus 2.9 percent and 2.8 percent, respectively), and children living in families with incomes of less than 100 percent of the poverty level had a higher percentage of DD compared with children in families with incomes at 200 percent or more of the poverty level (5.6 percent and 2.8 percent).

Learning Disability

Sex, age, race/ethnicity, family structure, and health insurance status were associated with having LD in patterns similar to those of children with ADD. As shown in table 1, the percentages with LD were 10.7 percent for boys and 5.5 percent for girls. The prevalence of LD increased with age, from 5.9 percent for children ages 5 to 9 to 9.5 percent for children ages 10 to 12. Significant differences were also found in the proportion of children with LD when comparing race and ethnicity, with higher percentages among White non-Hispanic children (8.4 percent) and Black non-Hispanic children (9.6 percent) than Hispanic children (6.7 percent) or children of other races/ethnicities (4.9 percent). In terms of family structure, 10.5 percent of children living with a single parent had LD, compared with 7.0 percent of children living with two parents. Also, similar to children with ADD, the proportion of children with LD was by far the highest (17.2 percent) among children who were covered by Medicaid.

However, the pattern is different for children with ADD compared with children with LD when it comes to mother's education. Differences in the mother's education level were not significant for children with ADD. The percentage of children with LD was significantly higher, however, among children whose mothers lacked a high school education or GED (10.8 percent) than it was for children whose mothers had a high school degree or GED or some college (8.1 percent) or a college degree or higher (5.6 percent).

The poverty level and having LD were inversely associated. The percentage of children with LD rose from 6.8 percent for families with incomes of 200 percent or more of the poverty level to 13 percent for families with incomes of less than 100 percent of the poverty level.

Table 1. Percentage of children 5–17 years of age in the general population and with selected emotional and behavioral problems, by selected demographic characteristics: United States, 1998–1999*, **, ***

Percentage of All Children Aged 5–17, With the Characteristic						
Selected Demographic Characteristics		Attention Deficit Disorder	Developmental Delay*	Had Learning Disability	Unhappy/Depressed	Mental Health Indicator****
Total	100.0	6.5(0.22)	3.6(0.16)	8.1(0.24)	3.7(0.16)	13.6(0.32)
Sex						
Male	51.9	9.6(0.37)	4.5(0.26)	10.7(0.38)	3.9(0.23)	15.3(0.45)
Female	48.1	3.3(0.22)	2.6(0.19)	5.5(0.28)	3.5(0.21)	11.7(0.38)
Age						
5–9	37.4	4.8(0.28)	3.8(0.27)	5.9(0.34)	3.0(0.23)	12.0(0.47)
10–12	22.4	7.9(0.52)	3.6(0.39)	9.5(0.55)	3.4(0.30)	14.0(0.65)
13–17	40.1	7.6(0.38)	3.3(0.26)	9.7(0.42)	4.7(0.28)	14.9(0.54)
Race and/or ethnicity						
White non-Hispanic	55.1	7.7(0.30)	3.9(0.23)	8.3(0.31)	3.4(0.19)	13.1(0.38)
Black non-Hispanic	16.2	5.0(0.44)	3.7(0.38)	9.5(0.67)	4.4(0.45)	15.6(0.85)
Hispanic	25.1	3.5(0.37)	2.5(0.25)	6.7(0.48)	4.3(0.39)	13.9(0.66)
Other	3.5	3.5(0.78)	3.0(0.92)	4.9(0.95)	3.7(0.88)	11.3(1.58)
Family structure						
Single parent	29.5	7.9(0.42)	4.4(0.33)	10.5(0.52)	5.8(0.38)	19.6(0.70)
Both parents	66.8	5.8(0.27)	3.2(0.19)	7.0(0.27)	2.9(0.17)	11.0(0.34)
Mom's education						
No HS	19.7	5.9(0.50)	4.0(0.44)	10.8(0.67)	5.9(0.51)	17.9(0.93)
HS or GED	30.1	6.9(0.42)	3.6(0.30)	8.1(0.49)	3.7(0.33)	13.9(0.62)
Some college	30.4	6.8(0.43)	3.6(0.34)	8.1(0.43)	3.2(0.27)	13.8(0.60)
College and +	19.8	5.4(0.44)	3.3(0.34)	5.6(0.45)	2.3(0.28)	8.7(0.63)
Low income						
\$20,000 or more	77.9	6.2(0.26)	3.3(0.18)	7.0(0.26)	3.2(0.17)	11.9(0.33)
Less than \$20,000	22.1	8.2(0.53)	5.0(0.47)	12.6(0.73)	6.1(0.45)	21.2(0.82)
Poverty index						
Less than 100 percent	13.2	8.4(0.71)	5.6(0.65)	13.0(0.90)	6.1(0.58)	21.5(1.10)
100–199 percent	16.9	7.1(0.57)	5.5(0.48)	10.2(0.70)	5.3(0.49)	18.1(0.91)
200 percent or more	48.7	6.5(0.33)	2.8(0.21)	6.8(0.30)	2.8(0.18)	11.1(0.35)
Health insurance						
Private	67.5	5.8(0.27)	2.9(0.19)	6.6(0.26)	2.7(0.17)	10.7(0.33)
Medicaid	14.6	10.8(0.76)	8.0(0.64)	17.2(0.92)	7.3(0.64)	25.1(1.07)
Other	2.3	8.0(1.39)	2.8(0.79)	6.9(1.33)	3.9(0.94)	14.7(2.07)
Uninsured	15.2	5.6(0.56)	2.8(0.47)	6.8(0.55)	5.3(0.50)	16.4(0.79)
Place of residence						
MSA	80.2	6.3(0.26)	3.4(0.18)	7.8(0.26)	3.5(0.17)	13.0(0.35)
Central city	30.9	6.0(0.39)	4.0(0.30)	8.2(0.44)	3.9(0.30)	14.3(0.58)
Non central city	49.3	6.5(0.33)	3.1(0.22)	7.7(0.33)	3.3(0.20)	12.3(0.44)
Not MSA	19.8	7.3(0.44)	4.3(0.40)	9.2(0.61)	4.5(0.39)	15.6(0.74)

Table 1. Percentage of children 5–17 years of age in the general population and with selected emotional and behavioral problems, by selected demographic characteristics: United States, 1998–1999*, **, *** (Continued)

Percentage of All Children Aged 5–17, With the Characteristic						
Selected Demographic Characteristics	Attention Deficit Disorder	Developmental Delay*	Had Learning Disability	Unhappy/Depressed	Mental Health Indicator****	
Region						
Northeast	17.8	5.8(0.44)	3.6(0.43)	8.3(0.57)	3.3(0.35)	11.2(0.60)
Midwest	21.6	7.2(0.44)	3.7(0.29)	8.6(0.50)	2.6(0.29)	13.2(0.66)
South	35.8	7.3(0.41)	3.8(0.28)	8.4(0.42)	4.4(0.28)	14.6(0.59)
West	24.7	5.2(0.46)	3.1(0.31)	7.0(0.42)	4.3(0.34)	14.2(0.60)

Data source: 1998 and 1999 National Health Interview Survey.

* Standard errors are shown in parentheses.

** Missing data have been excluded from this analysis.

*** A child may be counted in more than one column.

**** A child was defined as having a mental health problem if he/she obtained a score of 2 or more on the Mental Health Index as defined by questions used in the 1998–1999 NHIS.

Table 2. Percentage of children 5–17 years of age who have ADD, DD, LD or who are unhappy/depressed, given that they already have one of these problems: United States: 1998–1999*, **, ***

Percentage who also have...				
Observed Selected Emotional and Behavioral Problem	ADD	DD	LD	Unhappiness/Depression
Attention Deficit Disorder	100	18.2(1.34)	56.2(1.72)	14.5(1.18)
Developmental Delay	33.1(2.20)	100	69.9(2.19)	10.0(1.34)
Learning Disability	45.1(1.55)	30.9(1.40)	100	12.0(0.94)
Unhappy/depressed	25.6(1.80)	9.7(1.27)	26.4(1.85)	100

Data source: 1998 and 1999 National Health Interview Survey.

* Standard errors are shown in parentheses.

** Missing data have been excluded from this analysis.

*** A child may be counted in more than one row.

**** A child was defined as having a mental health problem if they obtained a score of 2 or more on the Mental Health Indicator as defined by questions used in the 1998–1999 NHIS.

Table 3. Percentage of children 5–17 years of age who utilized selected health services, given that they had or did not have selected emotional or behavior problems: United States, 1998–1999*, **, ***

Selected demographic characteristics	Contact with Mental Professional	Received Special Education	Perceived Unmet Medical Needs	Can't Afford Counseling	Had Seen a Medical Specialist	Had Seen a General Doctor	Taken Rx Med for 3 Months
Total	6.5(0.22)	6.6(0.23)	10.1(0.31)	1.1(0.10)	35.6(0.47)	75.1(0.42)	11.3(0.27)
Sex							
Male	7.4(0.32)	8.5(0.36)	9.8(0.395)	1.1(0.13)	34.5(0.61)	73.7(0.59)	13.3(0.42)
Female	5.5(0.29)	4.5(0.27)	10.5(0.41)	1.1(0.15)	36.7(0.64)	76.6(0.54)	9.3(0.34)
Age							
5–9	5.5(0.31)	5.9(0.32)	9.9(0.42)	0.9(0.14)	28.9(0.64)	78.6(0.59)	9.5(0.43)
10–12	6.5(0.44)	7.6(0.52)	9.1(0.53)	0.9(0.18)	36.5(0.91)	73.6(0.88)	11.9(0.54)
13–17	7.5(0.40)	6.7(0.38)	11.1(0.48)	1.4(0.19)	42.0(0.74)	72.3(0.67)	13.0(0.47)
Race and/or ethnicity							
White non-Hispanic	7.5(0.31)	7.0(0.30)	9.1(0.34)	1.1(0.12)	40.0(0.63)	78.1(0.50)	12.8(0.36)
Black non-Hispanic	5.4(0.44)	6.7(0.54)	12.1(0.88)	1.7(0.35)	29.0(0.87)	73.3(1.08)	10.1(0.74)
Hispanic	3.7(0.34)	5.1(0.42)	13.1(0.61)	0.6(0.13)	24.3(0.82)	64.9(0.90)	7.3(0.43)
Other	4.0(0.91)	4.1(0.96)	9.7(1.50)	0.7(0.37)	30.3(2.08)	69.6(2.31)	7.4(1.26)
Mom's education							
No HS	4.5(0.45)	8.0(0.59)	14.8(0.81)	1.2(0.25)	24.1(0.91)	64.1(1.02)	8.4(0.61)
HS or GED	6.5(0.43)	6.7(0.44)	11.1(0.60)	1.4(0.22)	34.8(0.82)	75.6(0.73)	10.6(0.51)
Some college	7.0(0.42)	6.4(0.42)	10.8(0.53)	1.3(0.19)	39.9(0.88)	77.2(0.73)	12.6(0.49)
College and +	6.4(0.48)	5.0(0.44)	4.4(0.41)	0.2(0.07)	41.6(0.98)	81.4(0.82)	13.5(0.66)
Family structure							
Single parent	9.4(0.43)	8.3(0.48)	15.6(0.68)	2.2(0.28)	32.8(0.81)	73.6(0.76)	12.0(0.52)
Both parents	5.2(0.24)	5.7(0.26)	8.2(0.32)	0.7(0.09)	36.7(0.54)	75.8(0.49)	11.1(0.34)
Health insurance							
Private	6.1(0.24)	5.3(0.25)	6.4(0.08)	0.7(0.08)	38.2(0.55)	78.2(0.46)	11.4(0.32)
Medicaid	10.4(0.74)	14.9(0.90)	12.1(0.32)	1.6(0.32)	33.1(1.07)	77.2(0.99)	15.3(0.84)
Other	9.5(1.71)	5.3(1.27)	7.7(1.52)	0.4(0.31)	37.1(3.00)	72.6(2.54)	12.7(1.73)
Uninsured	4.0(0.50)	4.7(0.49)	29.2(1.17)	2.8(0.48)	24.1(1.11)	56.5(1.20)	6.1(0.61)
Poverty index							
Less than 100 percent	7.8(0.62)	10.3(0.84)	18.8(1.09)	2.7(0.45)	29.0(1.17)	69.0(1.17)	10.9(0.81)
100–199 percent	8.0(0.58)	8.5(0.63)	18.3(0.90)	2.1(0.35)	32.1(1.03)	71.2(1.02)	10.8(0.68)
200 percent or more	6.5(0.27)	5.4(0.29)	6.1(0.30)	0.7(0.09)	40.7(0.66)	79.0(0.54)	12.7(0.41)

Data source: 1998 & 1999 National Health Interview Survey.

* Standard errors are shown in parentheses.

** Missing data have been excluded from this analysis.

*** A child may be counted in more than one column.

Table 4. Percentage of children 5–17 years of age who utilized selected health services, given that they had or did not have selected emotional or behavior problems: United States, 1998–1999*, **, ***

Selected Emotional and Behavioral Problem	Talked w/ MH Care Professional	Received Special Education	Perceived Unmet Medical Needs	Can't Afford Counseling	Medical Specialist	General Doctor	Taken Rx Medication for 3+
ADD							
ADD	37.6(1.62)	37.8(1.67)	18.3(1.33)	5.4(0.77)	97.0(0.75)	83.4(1.28)	50.7(1.68)
Without ADD	4.3(0.19)	4.3(0.20)	9.5(0.30)	0.8(0.09)	85.5(0.52)	74.5(0.43)	8.6(0.25)
LD							
LD	27.0(1.47)	53.9(1.57)	17.9(1.11)	4.5(0.62)	53.5(1.49)	79.6(1.27)	33.8(1.55)
Without LD	4.6(0.19)	2.4(0.14)	9.4(0.31)	0.8(0.09)	34.0(0.48)	74.7(0.43)	9.3(0.26)
Unhappy/Depressed							
Unhappy/depressed 5–17	29.1(2.08)	20.8(2.32)	23.4(1.943)	8.8(1.70)	86.8(2.04)	76.4(2.44)	26.9(2.61)
Not unhappy/depressed 5–17	5.6(0.21)	6.0(0.35)	9.6(0.30)	.08(0.08)	86.5(0.50)	75.0(0.64)	10.7(0.43)
Mental Health Indicator (MHI)****							
Identified	24.0(1.03)	21.1(1.00)	20.8(1.05)	5.3(0.56)	90.4(0.96)	78.5(0.98)	26.7(1.03)
Not identified	3.7(0.19)	4.3(0.19)	8.5(0.29)	0.4(0.07)	85.8(0.53)	74.6(0.46)	8.9(0.27)

Data source: 1998 & 1999 National Health Interview Survey.

* Standard errors are shown in parentheses.

** Missing data have been excluded from this analysis.

Unhappiness/Depression

Overall, 3.7 percent of children were unhappy/depressed, representing more than 1.9 million children (see table 1). The pattern of responses for children who were unhappy/depressed was consistent with most of the findings for children who had ADD, DD, and LD for health insurance status, family structure, poverty level, and age. The percentage of children who were unhappy/depressed was highest (7.3 percent) among children who were covered by Medicaid. Regarding family structure, unhappiness/depression was higher among children who were living with a single parent (5.8 percent) than for children living with both parents (2.9 percent). In terms of poverty level, the percentage of children in families with incomes less than 100 percent of the poverty level who were unhappy/depressed was 6.1 percent compared with 2.8 percent for children living in families with incomes that were 200 percent of the poverty level or more. For mother's education, children who were unhappy/depressed mirrored

those with LD. Almost six percent of children whose mothers had less than a high school education were unhappy/depressed, compared with 2.3 percent of children whose mothers had four years of college or more.

Comorbidity Among ADD, DD, LD, and Unhappiness/Depression

Many of the children with ADD, DD, LD, and unhappiness/depression were identified as having more than one of these four mental health conditions (see table 2). Among children with ADD, 18.2 percent also had DD, 56.2 percent also had LD, and 14.5 percent were also unhappy/depressed. Among children with LD, 45.1 percent also had ADD, 30.9 percent also had DD, and 12.0 percent were also unhappy/depressed. Among children who were unhappy/depressed, 25.6 percent also had ADD, 9.7 percent also had DD, and 26.4 percent also had LD. Other research has confirmed that children often

have more than one mental health condition (Barkley, 2002; Phelan, 2000).

Mental Health Problems Identified by the MHI

An estimated seven million children (13.6 percent) were identified with a mental health problem by the MHI. (As previously stated, the question on unhappiness/depression and the other items comprising the four question sets of the MHI were selected from CBCL because of their ability to discriminate between children who were or were not referred for mental health services.) The relationships between children with mental health problems and the sociodemographic variables were consistent with the findings for the other problems examined in this study. Boys had a higher percentage of having mental health problems compared with girls (15.3 percent versus 11.7 percent); and more older children ages 13 to 17 had mental health problems compared with younger children ages 5 to 9 (14.9 percent versus 12 percent). A higher percentage of Black non-Hispanic children had mental health problems than of other children (15.6 percent); however, no significant differences were found between Hispanic children and White non-Hispanic children in having mental health problems. The percentage of children identified with mental health problems was greater for children living with a single parent (19.6 percent) than for children living with both parents (11 percent). Additionally, as with children who had attention and cognitive problems, the percentage of children with mental health problems was higher for those covered by Medicaid (25 percent) than those with private or no insurance.

As expected, the MHI also identified some of the children with other specific problems studied here. The MHI captured 57.8 percent of children with ADD, 48.5 percent of children with LD, 43.3 percent of children with DD, and 94.3 percent of children who were unhappy/depressed.

Use of Health Services

According to data in the 1998–99 NHIS, 6.5 percent of U.S. children had contact with a mental health professional in the past 12 months, and 6.6 percent had received special education services (see table 3). In the past 12 months, 36 percent of U.S. children saw a medical specialist, 75.1 percent saw a general doctor, and 11.3 percent had taken pre-

scription medicine of some type for at least three months (for some reason, not necessarily a mental health problem). More than 500,000 children (1.1 percent) in the United States could not afford to get mental health care or counseling, however, and more than 4.3 million children (10.1 percent) had perceived unmet medical needs (i.e., their families were unable to afford medical care, prescription medicine, eye glasses, dental care, mental health care, or counseling during the past 12 months, or health care was delayed because of cost).

Although several sociodemographic variables were associated with children's use of services and perceived unmet medical needs, the most appreciable differences were found when examining health insurance status, the poverty level, and family structure. For children who lacked health insurance, the percentage having perceived unmet medical needs was four times as high as for children with private insurance (29.2 percent vs. 6.4 percent). Children without health insurance also had less contact with mental health care professionals and were less likely than other children to receive special education services, take medication, see medical specialists, or see general doctors. Furthermore, in terms of the poverty level, 18.8 percent of children living in families with incomes less than 100 percent of the poverty level had perceived unmet medical needs, compared with 6.1 percent of children living in families with incomes that were 200 percent or more of the poverty level. The percentage contacting a mental health professional was higher among children in single-parent families than among children living with both parents (9.4 percent vs. 5.2 percent), and similar patterns were seen for receiving special education services (8.3 percent vs. 5.7 percent) and having perceived unmet medical needs (15.6 percent vs. 8.2 percent).

Racial and ethnic differences were associated with children's use of health services and perceived unmet medical needs. Black non-Hispanic children and Hispanic children had more perceived unmet medical needs than other children (12.1 percent and 13.1 percent, respectively). However, when compared with other children, Hispanic children and children of other races/ethnicities were the least likely to have contact with mental health professionals, receive special education services, and take prescription medications.

Mothers' education also was associated with some of the health services examined. Children who had mothers with higher levels of education had higher percentages for taking prescription medica-

tion, seeing general medical doctors or specialists, and talking with mental health professionals.

Use of Services by Children with Attention, Cognitive, and Emotional Problems

As shown in table 4, children with ADD, with LD, who were unhappy/depressed, or who had mental health problems as defined by the MHI used selected health services at rates that were two to seven times as high as for children without these problems. Of children with ADD, 50.7 percent took prescription medicine for at least three months, versus 8.6 percent of children who did not have ADD; 37.6 percent had contact with mental health professionals, versus 4.3 percent of other children; and 37.8 percent received special education services, versus 4.3 percent of other children. Likewise, the percentage of children with ADD whose families were unable to afford needed counseling services was more than five times that for other children. More than five percent of children with ADD and LD could not afford needed counseling, whereas this percentage was less than one percent for other children. Approximately 75 percent of children with ADD received at least one of the services examined here (see figure 2), and 70 percent of children with LD received one of these services. Among children who were unhappy/depressed, 26.9 percent took prescription medicine and 8.8 percent could not afford counseling. Children identified by the MHI as having mental health problems also had higher percentages than other children for taking prescription medicine and being unable to afford counseling. Moreover, with one exception, these children had more contacts with medical specialists or general medical doctors than other children. For example, 83.4 percent of children with ADD had contact with general doctors, whereas only 74.5 percent of other children saw general doctors.

Discussion

Demographic Characteristics of Children with Emotional and Behavioral Problems. Responses obtained from parents in the 1998–99 NHIS indicate that among U.S. children ages 5 to 17, 6.6 percent, or 3.4 million, have ADD; 3.6 percent, or 1.9 million, have DD; 8.2 percent, or 4.3 million, have LD; 3.7 percent, or 1.9 million, are unhappy or depressed; and 13.6 percent, or seven million,

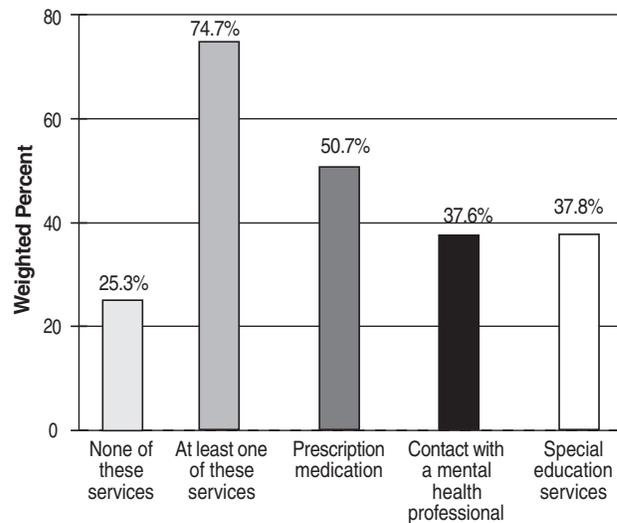


Figure 2. Percentage of Children 5–17 Years of Age With ADD Who Took Prescription Medicine, Had Contact With a Mental Health Professional, or Received Special Education Services: United States, 1998–1999.

were identified as having a mental health problem by the MHI (see figure 1). The figures for ADD, DD, and LD compare reasonably with other estimates found in the literature, which have ranged from 3 to 10 percent for ADD (DHHS, 1999; Palfrey, et al., 1985; Rowland et al., 2002), 3.4 to 4.0 percent for DD (Simpson, et al., 2003; Zill and Schoenborn, 1990) and from approximately 6.5 to 8.8 percent for LD (Zill and Schoenborn, 1990). Estimates found in this study are also consistent with other studies using NHIS (Blackwell and Tonthat, 2002; Bloom and Tonthat, 2002; Pastor and Reuben, 2002). However, the Youth Risk Behavior Survey reported higher estimates for children with depression, ranging from 10 to 15 percent (DHHS, 1996). The estimate of 13.6 percent of children identified with mental health problems by the MHI falls amid findings that vary from 10 to 22 percent for children with mental disorders (Achenbach and Howell, 1993; Angold, et al., 1998, 1999; Burns et al., 1995; Costello, 1989; Costello, et al., 1999; DHHS, 1999; Offord, 2000; Zill and Schoenborn, 1990).

Although the data in this study are derived from parents' answers rather than clinical evaluations, the parents were not asked to make their own assessments. Rather, the questions on ADD, DD, and LD asked the parents if they were told that their child had this condition by a health professional or, in the case of LD, if they were told by a school

or health professional. Nevertheless, these data may be underestimates of the true clinical prevalence, especially for depression. The question on being unhappy/depressed requires parents to assess children's internalized depressed feelings, and parents may simply not be aware of children's true feelings. Compared with the present study, other studies found higher rates for depression among adolescents (DHHS, 1996) as well as higher rates for girls (Angold, et al., 1998; Weissman and Klerman, 1992).

The gender differences found in this analysis for ADD, LD, DD, and MHI status reflect the gender differences for children consistently documented in the literature (Bloom and Tonthat, 2002; Colpe, 2001; Cuffee, et al., 1995; Goodman and Stevenson, 1989; Koot and Verhulst, 1992). It may be that boys are more readily identified because they exhibit more disruptive behavior, which, according to Verhulst and van der Ende (1997), leads adults to seek treatment for them. In the present study, no significant difference was seen between boys and girls in being depressed.

Also mirroring the findings from other studies was the increase in the chances of children having ADD or LD with increasing age, differences between races (Bloom and Tonthat, 2000; Colpe, 2001; Zill and Schoenborn, 1990), and public assistance (Offord, et al., 1987). Functional limitations and learning disabilities appear to emerge rapidly between ages seven and nine as children have begun to attend school. In terms of racial differences, the percentage of White non-Hispanic children having ADD was higher than that of other children. However, these differences may be related to the resources available to White non-Hispanic children, which may lead toward better identification and diagnoses for them (U.S. Department of Education, 1996). In the present study, children who received Medicaid were twice as likely as children with private health insurance to have LD or DD, be unhappy or depressed, or be identified by the MHI as having a mental health problem. Among children who received Medicaid, 10.8 percent had ADD. Among children who were uninsured or on private insurance, 5.6 and 5.8 percent, respectively, had ADD.

Another interesting finding, also documented in the literature, was that living with single parents was significantly related to whether children had ADD, DD, LD, were unhappy or depressed, or were identified by the MHI as having a mental health problem (Bloom and Tonthat, 2002; Colpe, 2001; Dawson, 1991; Simpson and Fowler, 1994); however, the causes for this relationship are undetermined.

The impact and stress of a child's problems on family members has been documented (Colpe, 2001; Hough and Lollar, 1998) and hypothesized to lead to family dissolution. Barkley and colleagues (1991) found that families with children who had ADHD were less stable over time than other families. Some of these problems may have genetic links. One study (Smalley et al., 2000) found that 55 percent of children with ADHD had at least one parent with ADD, and family history is also considered a risk factor for adolescent depression (Weissman and Klerman, 1992). Thus, for some of these families, stress from an attention, cognitive, or emotional condition may already be present in the family before the child's symptoms begin to emerge.

Service Use

One of the principal focuses of the 2000 Surgeon General's Conference on Children's Mental Health, and a concept supported in other studies (Rowland et al., 2002; Simpson, et al., 1997; Verhulst and van der Ende, 1997; Zito, 2001), was that racial and socioeconomic disparities exist in children's use of mental health services (DHHS, 1999). The results of the present analysis augment these findings. In this study, a child's perceived unmet medical needs were defined by the parent's response that the family could not afford medical care, dental care, mental health care, or counseling during the past 12 months or that they delayed getting care for the child during that period. Children with the highest levels of perceived unmet medical needs or who were unable to afford counseling were those who were uninsured, lived in families with incomes less than 100 percent of the poverty level, and lived with a single parent. The percentage of children who had contact with mental health professionals, took prescription medicine, or saw doctors was higher for White non-Hispanic children than for other children.

In this study, as in the literature, health insurance and the Medicaid program were found to play a major role in the ability of children to obtain mental health services (Pottick, et al., 1995; Zito, 2001). In the 1998-99 NHIS data, 29 percent of children who lacked health insurance met the study definition for perceived unmet medical needs. Compared with other children, higher percentages of children receiving Medicaid had contact with mental health professionals, were receiving special education services, or were taking medicine. Although significantly higher percentages of children on Medicaid

were receiving mental health services than other children, 10 percent of the children on Medicaid also met the study definition of having unmet medical needs.

According to the data in this study, dramatic differences exist between children with attention, cognitive, and emotional problems versus other children for taking prescription medicine, contacting a mental health professional, receiving special education services, or seeing a medical specialist. Compared with other children, children with ADD had percentages that were nine times as high for receiving special education services or having contact with a mental health professional and six times as high for taking prescription medicine. In addition to psychiatric and specialized services used by children with attention, cognitive, and emotional problems, these data supported the supposition that overall costs for regular medical services for children with these problems were higher because they had more doctor visits than other children. According to Leibson and colleagues (2001), medical costs for children with ADD were more than double the costs for other children. In addition, children with ADD were more likely than other children to have major injuries (Leibson et al., 2001), be involved in automobile accidents involving bodily injury (Barkley, et al., 1996), and to smoke cigarettes and use marijuana (Barkley et al., 1991).

Limitations

In evaluating these findings, several limitations must be acknowledged. NHIS, a cross-sectional survey, cannot be used to determine causation. As previously stated, the findings are based on parent report, not clinical diagnosis, and all parents may not understand changing terminology on attention, cognitive, and emotional problems, such as developmental delay and Attention Deficit Disorder or Attention Deficit Hyperactivity Disorder. The question on whether a child has a learning disability does not clearly exclude ADD or ADHD. Some parents may have responded positively to LD for a child having ADD, accounting for some of the comorbidity reported here. In addition, the question on special education services does not include other services offered for children with learning disabilities, such as tutor-

ing, special instruction, or a 504 plan (Educational Resources Learning Center, 2000), so children receiving other services may not have been included.

Conclusion

In conclusion, this study found that several sociodemographic characteristics, including gender, age, race, family structure, and income, were associated with children having ADD, DD, LD, and unhappiness/depression. Many of these children had more than one condition. Among children with ADD, 18.2 percent had DD, 56.2 percent had LD, and 14.5 percent were unhappy/depressed. Furthermore, children with ADD, LD, and unhappiness/depression were more likely than other children to use the health services examined here, such as contact with a mental health professional, receipt of special education services, seeing a medical specialist, or taking prescription medicine for at least three months. For example, children with ADD had rates of contact with a mental health professional that were nine times those of other children. In examining some of the demographic characteristics associated with children's use of health and mental health services, this study also revealed the existence of socioeconomic disparities, as reported by the U.S. Surgeon General (DHHS, 1999). Children with the highest level of perceived unmet medical needs or who were unable to afford counseling were those who were uninsured, lived in families with incomes less than 100 percent of the poverty level, or lived with a single parent. Among children who were uninsured, 29.2 percent had perceived unmet medical needs, compared with 6.4 percent for children with private insurance and 12.1 percent for children on Medicaid. These findings also indicate that almost one-fifth of children with ADD, with LD, who were unhappy or depressed, or who were identified in this study as having a mental health problem according to the MHI had perceived unmet medical needs. Approximately 23.4 percent of children who were unhappy/depressed, 18.3 percent of children with ADD, 17.9 percent of those with LD, and 20.8 percent of those identified with a mental health problem by the MHI had perceived unmet medical needs. Many children with these problems clearly have medical needs that continue to be unmet.

Appendix

Questions on Child Behavior in the 1998–99 NHIS Derived From the Child Behavior Checklist (CBCL)

I am going to read a list of items that describe children. For each one, tell me if it has been NOT TRUE, SOMETIMES TRUE, or OFTEN TRUE of (child's name) during the past six months.

1. Males—ages 5 to 11

- Doesn't get along with other kids
- Can't concentrate or pay attention long
- Feels worthless or inferior
- Has been unhappy, sad, or depressed

2. Females—ages 5 to 11

- Can't concentrate or pay attention long
- Has been nervous, high strung, or tense
- Acts too young for her age
- Has been unhappy, sad, or depressed

3. Males—ages 12 to 17

- Can't concentrate or pay attention long
- Lies or cheats
- Doesn't get along with other kids
- Has been unhappy, sad, or depressed

4. Females—ages 12 to 17

- Lies or cheats
- Does poorly at schoolwork
- Has trouble sleeping
- Has been unhappy, sad, or depressed

REFERENCES

- Achenbach, T. M., & Howell, C. T. (1993). Are American children's problems getting worse? A 13-year comparison. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*(6), 1145–1154.
- Achenbach, T. M., & Ruffle, T. M. (2000). The Child Behavior Checklist and related forms for assessing behavioral/emotional problems and competencies. *Pediatrics in Review, 21*(1), 265–271.
- Angold, A., Costello, E. J., Farmer, E. M. Z., Burns, B. J., & Erkanli, A. (1999). Impaired but undiagnosed. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*(2), 129–137.
- Angold, A., Costello, E. J., & Worthman, C. M. (1998). Puberty and depression: The roles of age, pubertal status and pubertal timing. *Psychological Medicine, 28*, 51–61.
- Barkley, R. A. (2002). ADHD—Long-term course, adult outcome, and comorbid disorders. Chapter 4. In Jensen, P. S. & J. R. Cooper (Eds.) *Attention Deficit Hyperactivity Disorder* (pp. 6–7). Kingston, NJ: Civic Research Institute.
- Barkley, R. A., Murphy, K. R., & Kwasnik, D. (1996). Motor vehicle driving competencies and risks in teens and young adults with Attention Deficit Hyperactivity Disorder. *Pediatrics, 98*(6), 1089–1095.
- Barkley, R. A., Fischer, M., Edelbrock, C., & Smallish, L. (1991). The adolescent outcome of hyperactive children diagnosed by research criteria III. *Journal of Child Psychology and Psychiatry, 35*(2), 233–255.
- Blackwell, D., & Tonthat, L. (2002). Summary health statistics for U.S. Children: National Health Interview Survey, 1998. National Center for Health Statistics. *Vital Health Statistics, 10*(208).
- Bloom, B., & Tonthat, L. (2002). Summary Health Statistics for U.S. Children: National Health Interview Survey, 1997. National Center for Health Statistics. *Vital Health Statistics, 10*(203).
- Burns, B. J., Costello, E. J., Angold, A., Tweed, D., Stangl, D., Farmer, E. M. Z., et al. (1995). Children's mental health service use across service sectors. *Health Affairs, 14*(3), 147–159.
- Colpe, L. J. (2001). Estimates of mental and emotional problems, functional impairments, and associated disability outcomes for the U.S. child population in households. In Manderscheid, R. W., & M. J. Henderson (Eds.), *Mental Health United States, 2000* (pp. 269–278). Washington, DC: Center for Mental Health Services, U.S. Government Printing Office.
- Costello, E. J. (1989). Developments in child psychiatric epidemiology. *Journal of the American Academy of Child and Adolescent Psychiatry, 28*, 836–841.
- Costello, E. J., & Janiszewski, S. (1990). Who gets treated? Factors associated with referral in children with psychiatric disorders. *Acta Psychiatrica Scandinavica, 81*, 523–529.
- Cuffee, S. P., Waller, J. L., Cuccaro, M. L., Pumariaga, A. J., & Garrison, C. Z. (1995). Race and gender differences in the treatment of psychiatric disorders in young adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 34*(11), 1536–1543.
- Dawson, D. A. (1991). Family structure and children's health and well-being: Data from the 1988 National Health Interview Survey on Child Health. *Journal of Marriage and the Family, 53*, 573–584.
- Dulcan, M. K. (1996). Introduction: Epidemiology of child and adolescent mental disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 35*(7), 852–854.
- Educational Resources Information Center (ERIC). 2000. A guide to disabilities: Rights are laws. ERIC Clearinghouse on Disabilities and Gifted Education. <http://www.ncd.gov/newsroom/publications/disabilityrights.html>.
- Glascoe, F. P., Altemeier, W. A., & MacLean, W. E. (1989). The importance of parents' concerns about their child's development. *American Journal of Diseases of Children, 143*, 955–958.

- Glascoe, F. P., MacLean, W. E., & Stone, W. L. (1991). The importance of parents' concerns about their child's behavior. *Clinical Pediatrics*, 30, 8–11.
- Goodman, R., & Stevenson, J., (1989). A twin study of hyperactivity—an examination of hyperactivity scores and categories derived from Rutter teacher and parent questionnaires. *Journal of Child Psychology and Psychiatry*, 30(5), 671–689.
- Hough, J. F., & Lollar, D. J. (1998). Measuring the impact on families of children's disabilities: Data from the 1994–1995 National Health Interview Survey Supplement on Disability. Presentation at the 1998 Annual Meeting of the American Public Health Association, Washington, D. C.
- Koot, H. M., & Verhulst, F. C. (1992). Prediction of children's referral to medical health and special education services from earlier adjustment. *Journal of Child Psychology and Psychiatry*, 33(4), 717–729.
- Leibson, C. L., Katusic, S. K., Barbaresi, W. J., Ransom, J., & O'Brien, P. C. (2001). Use and costs of medical care for children and adolescents with and without Attention-Deficit/Hyperactivity Disorder. *Journal of American Medical Association*, 285(1), 60–66.
- Offord, D. R. (2000). Identification of mental health needs. In *Report of the Surgeon General's Conference on Children's Mental Health: A National Action Agenda* (pp. 16–17). Washington, DC: Department of Health and Human Services.
- Offord, D. R., Boyle, M. H., & Jones, B. R. (1987). Psychiatric disorder and poor school performance among welfare children in Ontario. *Canadian Journal of Psychiatry*, 32, 518–525.
- Palfrey, J. S., Levine, M. D., Walker, D. K., & Sullivan, M. (1985). The emergence of attention deficits in early childhood: A prospective study. *Journal of Developmental and Behavioral Pediatrics*, 6(6), 339–348.
- Pastor, P. N., & Reuben, C. A. (2002). Attention Deficit Disorder and Learning Disability: United States, 1997–98. National Center for Health Statistics. *Vital Health Statistics*, 10(206).
- Phelan, T. W. (2000). *All about attention deficit disorder* (2nd ed.). Glen Ellyn, IL: Child Management, Inc.
- Pottick, K., Hansell, S., Guttermann, E., & White, H. R. (1995). Factors associated with inpatient and outpatient treatment for children and adolescents with serious mental illness. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34(4), 425–433.
- Rowland, A. S., Umbach, D. M., Stallone, L., Naftel, A. J., Bohlig, E. M., & Sandler D. P. (2002). Prevalence of medication treatment for Attention Deficit-Hyperactivity Disorder among elementary school children in Johnston County, North Carolina. *American Journal of Public Health*, 92(2), 231–234.
- Simpson, G., Bloom, B., Cohen, R. A., & Parsons, P. E. (1997). Access to health care part I: Children. National Center for Health Statistics, *Vital Health Statistics*, 10(196).
- Simpson, G. A., Colpe L., & Greenspan S. (2003). Measuring functional developmental delay in infants and young children: Prevalence rates from the NHIS-D. *Paediatric & Perinatal Epidemiology*, 17(1), 68–80.
- Simpson, G. A., & Fowler, M. G. (1994). Geographic mobility and children's emotional/behavioral adjustment and school functioning. *Pediatrics*, 93(2), 303–309.
- Smalley, S. L., McGough, J. J., Delhomme, M., Newdellman, J., Gordon, E., Kim, T., et al. (2000). Familial clustering of symptoms and disruptive behaviors in multiplex families with attention deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39(9), 1135–1143.
- U.S. Department of Education. (1996). *Urban schools: The challenge of location and poverty* (Lippman, L., S. Burgess, & E. McArthur, eds.). Washington, DC: National Center for Education Statistics.
- U.S. Department of Health and Human Services (DHHS), Office of the Assistant Secretary for Planning and Evaluation (1996). *Trends in the well-being of America's children and youth*. Washington, DC: 106–107.
- U.S. Department of Health and Human Services. (1999). *Mental Health: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.
- Verhulst, F. C., & van der Ende, J. (1997). Factors associated with child mental health service use in the community. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36(7), 901–909.
- Weissman, M. M., & Klerman, G. L. (1992). Depression: Current understanding and changing trends. *Annual Review of Public Health*, 13, 319–339.
- Zill, N., & Schoenborn, C. A. (1990). Developmental, learning, and emotional problems: Health of our nation's children, United States, 1988. (Advance data from vital and health statistics; No. 190.) Hyattsville, MD: National Center for Health Statistics.
- Zito, J. M. (2001). Pharmacoeconomics of methylphenidate and other medications for the treatment of ADHD. In Manderscheid, R. W., & M. J. Henderson (Eds.), *Mental Health United States, 2000* (pp. 113–119). Washington, DC: Center for Mental Health Services, U.S. Government Printing Office.